WIRE
& WIRE PRODUCTS

The fact remains that the European competitor is able to undersell the American Wire Manufacturer, in spite of heavy duty and transportation charges.

What Made It Possible?

The following will throw some light on the subject:

1. **Die cost is reduced to a minimum with UN-WIDIA and WALLRAMITE dies, which have replaced the chilled iron, steel and in the case of hard wire, diamond dies.**
2. **Production per machine is increased from 25% to 35% due to increased drawing speed and continuous drawing with UN-WIDIA and WALLRAMITE dies.**
3. **Quality of the wire is much finer at a decreased cost.**
4. **With better quality of wire from the coarse wire machine, the diamond dies last twice as long on size when re-drawing on fine wire.**
5. **Labor is reduced in direct proportion to machine production.**
6. **Die room cost is cut 75% and more.**
7. **Many of the usual cleaning operations are eliminated by the use of UN-WIDIA and WALLRAMITE dies.**

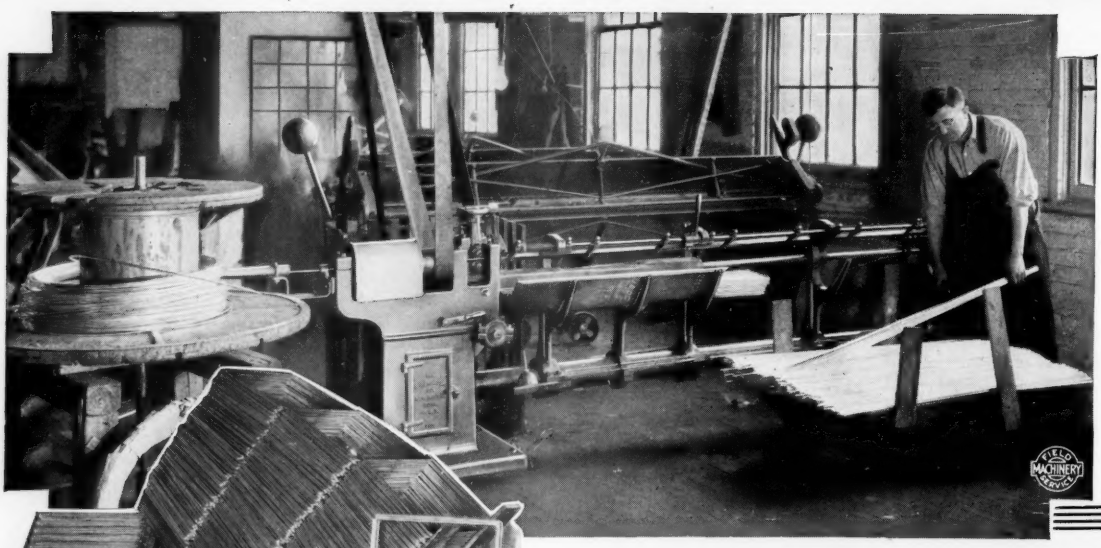
UN-WIDIA AND WALLRAMITE DIES ARE MANUFACTURED AND SOLD EXCLUSIVELY BY THE

UNION WIRE DIE CORP.

Manufacturers of diamond and alloy metal dies

250 WEST 40 STREET NEW YORK CITY

December 1928



The wire on and leaning against the truck has just been straightened and cut on the Shuster. In the rear are some of the 56¼" pieces that have been bent into shape. At the left are finished oven racks—made from wire cut on the Shuster machine.

Saving 10%!

A Shuster Wire Straightening and Cutting-off Machine is shown here straightening No. 6 tinned wire 3/16" diameter and cutting it into 56¼" lengths. Shuster efficiency has resulted in a saving of 10% in time and material on this operation. It has effected similar economies on Nos. 9 and 3 tinned wire and Nos. 14 and 16 gage core wire.

The owners of this machine, the George D. Roper Corp. of Rockford, Illinois, manufacture gas and electric ranges, gas furnaces and pumps on a large scale, and the savings the Shuster has accomplished in its two years of service has brought forth the following recommendation from them:

"Very good! Simple in construction and operation — needs no maintenance."

All details gladly sent upon request.

THE F. B. SHUSTER COMPANY

NEW HAVEN, CONN.

Straightener Specialists Since 1866

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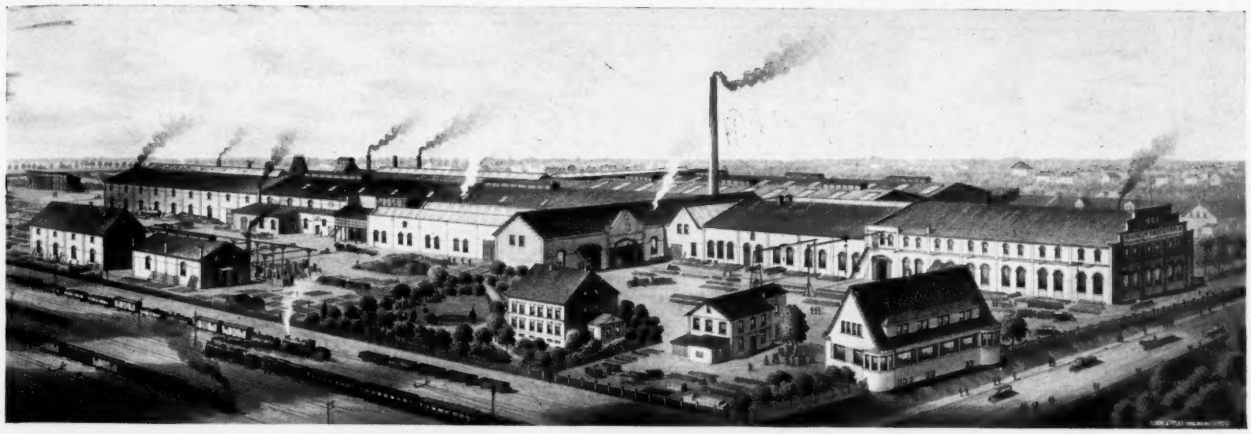

For the first time, the firm of

WILHELM BREITENBACH

(of Unna, Westfalia, Germany)

offers its products to the American wire industry through this advertising medium. The Breitenbach machines have been for decades installed in most of the leading wire factories of Germany and numerous important plants in all other parts of the European continent.

The firm of Wilhelm Breitenbach, established in 1863, has for 60 years been solely occupied with the construction of wire working machines, and it therefore possesses an unusual experience in this line.

A large equipment of special machines and the fact that the machines are constructed from raw material to finished product right in the shop itself, enables us to quote very low prices and, furthermore, the quality of the machines is unsurpassed.

The Various Main Products are the following:

1. **FOR FRICTION, HEAVY AND MEDIUM DRAWING,** of standard as well as special design protected by patent. The special features are the unsurpassed screw spring friction coupling of special design as well as the shaft in ball bearings, patent protected, covered by an oil casing.
2. **FOR FINE DRAWING AND VERY FINE DRAWING** in standard and special designs. The following machines are especially worthy of mention:
   - **a.** For fine drawing and very fine drawing with screw spring friction coupling adapted for special wires.
   - **b.** For fine drawing and very fine drawing with quick disengaging coupling, especially for steel wire.
   - **c.** For very fine drawing with attached winding device, especially for wire rope.
3. **MULTIPLE DRAWING MACHINES** designed especially for iron wire from 2.2 mm up (patented design). Drawing rollers and drawing stones are entirely cooled in the drawing liquid during operation. For iron wire from 2.2 down to 0.8 mm, the output of 1000 kilos per laborer in 8 hours is unexcelled.
4. **WINDING APPARATUS,** with special drive or gear, for steel wire hardening and galvanizing plants. Made for wire of all dimensions.
5. **RAPID WINDERS** for respooling galvanized wires, **WIRE WASHING, WIRE POINTING** machines and similar machinery.

The American wire industry also needs these machines, because they are highly developed in every respect.

Expert representatives who are in close relations with the American wire industry are wanted.

WILHELM BREITENBACH, Unna (Westfalia, Germany)

Machines for Wire Production

An Announcement of Improved Service Facilities

OUR removal to the office we now occupy in the **Hudson Terminal Building, 30 Church Street, New York City,** has provided spacious and conveniently located headquarters for our expanding business in machinery for the wire industry. The new location is in the heart of the metals and machinery trading district. We ask that you make note of the new address and we take pleasure in extending a cordial invitation to call.

High Productive:
- **Bolt Presses**
- **Nut Presses**
- **Rivet Presses**
- **Chain Forming Machines**
- **Pin and Needle Machines**
- **Point Grinding Machines**
- **Poultry Netting Machines**
- **Wire Staple Machines**
- **Wire Spooling Machines**
- **Wire Weaving Machines**

Expert Engineering Service available at all times

M. A. IRMISCHER

Machinery for the Wire Industry

30 Church Street, New York, N. Y.

Telephone: Cortland 5481

NO gift of second-sight is required to guess the identity of the "man in the public eye" in the following observations by an economist of the Harriman National Bank.

* * *

"A certain eminent man", we read, "now daily in the public eye, and who has made, also, a mark in the mining and engineering world, attributes much of his success to a rule he adopted early in his career and which he has practiced persistently ever since.

* * *

"Apart from its face value, if the measure of his achievements be any criterion, it is a rule worth remembering. It runs: "Learn your *business*, not merely your job."

* * *

"To learn one's job, is not, in the main, a difficult matter—given concentration on the work in hand, ability and common sense in its application, a steady way of handling emergencies, a savour of enthusiasm and determination, and dependability to bind these qualities together.

* * *

"To know only one's job is to set a partition between oneself and the world; to know one's business is to have a clear, Hooverized sweep of the whole horizon. It means seeing, thinking, reasoning, working to build up from the small area of an individual job with such adequacy as spells perfection."

* * *

First of the obvious steps toward knowing the wire business is to keep informed about the progress of the industry as a whole and of the industries associated with it. *Wire & Wire Products* exists for that purpose and is the only publication even attempting to cover your field.

The Publishers

WIRE & WIRE PRODUCTS

A monthly publication devoted to wire drawing and wire forming

Vol. 3 **December, 1928** **No. 12**

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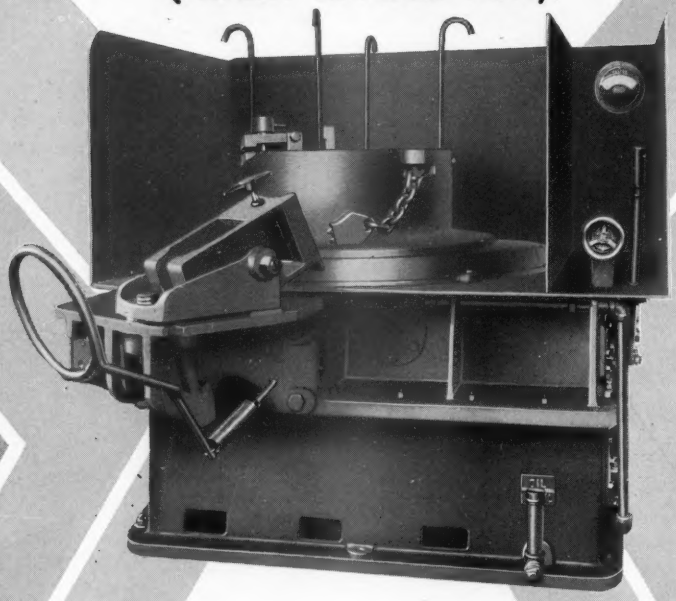
VAUGHN
LARGE SIZE
MOTOBLOC

(PATENT APPLIED FOR)



A 100% PRODUCER

It is the unique ability of this large size Motobloc to maintain a high rate of production for the entire range of wire gauges from ¾" down to ¼" size that appeals to so many wire manufacturers who have adopted Motoblocs as Standard Equipment.

This versatile adaptability of the large size Motobloc thus enables wire manufacturers to easily meet the size requirements of any special order as well as running the regular standard sizes in between times.

Having no idle periods this size motobloc is always a 100% producer.

Why not investigate its many advantages—your inquiry will not obligate you in any way.

VAUGHN MACHINERY COMPANY

Cuyahoga Falls, Ohio

Export Office—420 LEXINGTON AVENUE, NEW YORK, N. Y.

WIRE & WIRE PRODUCTS

Vol. 3 DECEMBER, 1928 No. 12

Why a Trade Association?

Advantages and benefits of a type of cooperative organization that is becoming increasingly valuable in industry

THE growing importance of the Trade Association as an instrumentality for the solution of the larger problems of business was emphasized by President William Butterworth of the Chamber of Commerce of the United States in an address before the Business Secretaries' Forum of Chicago, June 29th, 1928, "Only in this way," he said, "can industry meet legally such serious difficulties as overproduction, unethical practices, price cutting and wastes in distribution and retailing."

Men do not enter permanently into this form of cooperation with other men in their trades or industries unless they have a clearly understood identity of interest. It is not enough for them to feel vaguely that something ought to be done or to be told in general terms what a Trade Association might do for their line of business. They must know specifically what their common, as distinguished from their individual, interests are.

What the members want to do is the first logical question in the formation of a Trade Association. Its answer brings to consciousness the identity of interest which is the tie which brings them together and afterwards holds them together in permanently organized Trade Associations. Its answer does more than lay down a program of action. It lays down the psychological foundation on which the structure of organization must be built, if it is to be permanently built. It replaces feelings of suspicion, based on lack of knowledge, and acts of hostility, based on shortsighted self-interest, with feelings of friendliness and acts of co-operation.

The second question, how to do it, follows the working out of concrete proposals, which are the functions of a Trade Association.

Profits Replace Losses

In some industries excess capacity for production exists. In others competitive conditions are so keen as to make profits meager. In others, new production methods coming into use are making obsolete the methods previously employed. In still others, competition from the outside—new products replacing old—is causing profits to give way to losses. Each industry can keep informed on its economic situation by self-regulation through the operation of a Trade Association.

The written instrument which describes and defines the general features of a Trade Association's organization, responsibilities, duties, and powers is its by-laws, or its constitution and by-laws. By-laws are important. They are a statement of the Association's objects, of the method of conducting its activities, as well as an authoritative definition of its forms of organization.

Among the most important functions of a Trade Association are the following:

1. Establishment and maintenance of friendly relations among the members who can hold sectional and national meetings to discuss matters that are of mutual interest.

2. A country-wide distribution of technical material on all phases of development in the industry, manufacture and use—Public Relations.

Educational publicity and cooperative advertising in the interest of the industry as a whole. Bulletin service on conventions and expositions; representation of the industry at such events.

3. Employee Relations.

Research and collection of information on personnel management.

Group education and training.

Employment conditions and facilities, including a study of

such factors as labor turnover and seasonal changes in the demand for employees. Wage scales and method of compensation in manufacture and distribution.

Employee representation.

Accident prevention and employee liability.

Social welfare work.

4. Better relations between manufacturers and their customers.

5. Promotion of truth in advertising.

6. Elimination of misbranding in the industry.

7. Standardization and simplification as a means for the effective elimination of waste.

a. Simplication of trade procedure.

b. Standardization of trade terminology.

c. Simplification of styles, sizes and varieties.

d. Standardization of printed forms such as contracts of sale, warehouse forms, etc.

8. Elimination of trade abuses.

9. Operation of a Credit Bureau and exchange of credit information. Collection of information by which manufacturers may judge whether or not to ship merchandise in response to orders received; and for the purpose of giving financial stability to the industry as a whole.

10. Encouragement and support of commercial and industrial research.

Production Costs and Data

Scientific studies of production methods and analysis of production costs.

Study of distributive methods.

Developments in use of new materials, new applications of existing materials and by-products.

Studies of territories in the economical distribution and marketing of the product.

New uses and outlets for products and by-products.

Economical limits of trade territories.

11. Compilation of statistics on all phases of the industry; market reports. For the purpose of presenting an accurate picture of market conditions, items a., b., c., d., e., f. and g. should be collected monthly and expressed as totals for the principal types of product for comparison with previous periods.

a. Production.

b. Shipments.

c. Stocks on hand.

d. Unfilled orders.

e. Sales.

f. Production and purchases of raw materials used in manufacture.

g. Prices (closed transactions).

h. Employment — number, wages and turnover.

i. Monthly statistics of other basic industries which tend to show general business conditions.

12. Legislative Work and Legal Aid.

Laws and Legislation

Scrutinizing proposed legislation which might affect the industry and presenting the views of the industry in Congress and in State Legislatures relating to such subjects as:

Insurance.

Transportation facilities and rates.

Credit practices.

Employee relations.

Other trade association activities.

13. Co-operation with Government departments.

Taxation—Federal and State, affecting the industry. Government Bureaus and Departments such as the Federal Trade Commission on "Trade Practice Submittals," the Department of Commerce.

Tariffs—Domestic and Foreign, and effect of.

Foreign regulations concerning salesmen.

14. Establishment of a uniform system of cost accounting.

Accounting and Insurance

Adoption of uniform methods of accounting based on an accepted classification in order that comparable percentages in manufacturing and distribution, for different establishments may be obtained on such items of expense as:

Direct material.

Direct labor.

Indirect material and labor.

Transportation.

Selling.

Overhead.

15. Establishment of a Code of Ethics—Trade Relations.

Preparation and adoption of codes of practice to serve as a guide in the business dealings between manufacturers and distributors.

Collection and circulation of information relating to trade abuses which are found in dealings between manufacturers, wholesalers and retailers and which constitute a heavy burden of expense on an entire industry.

Promotion of conciliation and arbitration as an economical and prompt means for settling commercial disputes between members of an industry.

16. Insurance Problems.

Rates of insurance in different localities and in factories of different kinds. Educational publicity on the interpretation and terms of insurance policies.

General information service on insurance problems.

Facts relating to workmen's liability (compensation) insurance.

Co-operative insurance as a means for obtaining lower rates.

Transportation Rates

17. Traffic and Transportation.

Studies of freight classification and rates.

Special services relating to car supply, storage and transit privileges.

Auditing transportation bills.

Relations with carriers.

Appearances before the Interstate Commerce Commission.

Traffic Bulletin Service to inform members of changes in such matters as rates, routing, embargoes, suspensions or discontinuance of service by transportation companies.

18. Co-operation to make the industry a more satisfactory business to be engaged in.

19. Use of association headquarters as a central clearing house for information of all kinds which may be of interest to members.

Proposed Standards for Trolley Wire Reels

Special committee reports on the three designs tentatively adopted for shipping and stringing

RECOMMENDATIONS for three standard size reels for trolley wire, each the same in all detail except the flange diameter, were made by the Power Special Committee of the American Electric Railway Engineering Association at the annual convention held at Cleveland in September.

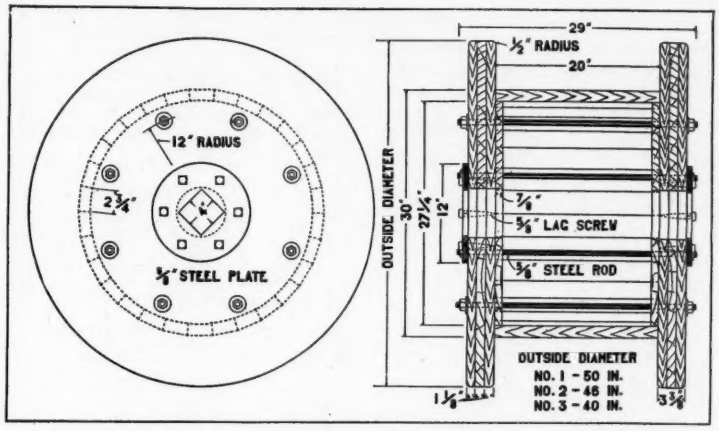
The report gives detail drawings showing the dimensions of the various parts of the proposed reels and a tabulation giving the capacities for various sizes of trolley wires, thus showing the application of the proposed standards. There is also available a drawing showing the details of a bushing it is proposed to use so that each user can have the size and shape of the arbor hole to suit himself.

Present Sizes Arbitrary

The 1927 Committee gathered a great deal of information from the various manufacturers of trolley wire and also from operating companies. A digest of the data showed a wide divergence of ruling dimensions of reels in use. The 1928 Committee has failed to find any definite reason for this divergence, other than the more or less arbitrary adoption of convenient sizes of available reels. There is also a diversity of opinion as to the size and shape of the arbor hole.

At earlier meetings during the year various proposals were discussed and three standards set up, together with a standard bushing. These proposed standards were turned over to a subcommittee composed of manu-

(*Please turn to page 424*)



Proposed standard wooden reel for trolley wire—side elevation and cross section through center.

APPLICATION OF REELS

	Wire Size	Actual pounds	Reel capacity, pounds Round	Grooved
No. 1 reel, 50″ x 30″ x 20″				
1 mile round or grooved	300,000	4,792	5,300	5,060
1½ mile round or grooved	0000	5,076	5,320	5,120
1½ mile round or grooved	000	4,020	5,180	4,730
No. 2 reel, 46″ x 30″ x 20″				
½ mile round or grooved	300,000	2,396	3,755	3,580
1 mile round or grooved	0000	3,400	3,990	3,540
1 mile round or grooved	000	2,680	4,010	3,615
1½ mile round or grooved	00	3,200	3,992	3,265
1 mile round or grooved	00	2,140	3,992	3,265
No. 3 reel, 40″ x 30″ x 20″				
½ mile round or grooved	0000	1,700	1,948	1,867
½ mile round or grooved	000	1,340	1,935	1,867
½ mile round or grooved	00	1,070	1,918	1,826

Table 1—Capacities for Proposed Standard Wooden Reels for Trolley Wire

Reel sizes						300,000 C. M. wire						0000 wire						000 wire						00 wire					
Outside diameter	Diameter of drum	Inside width	Volume, cubic inches	Type of wire	Nominal reel capacity	Turns per layer	Number of layers	Average feet per turn	Feet	Pounds	Margin, inches	Turns per layer	Number of layers	Average feet per turn	Feet	Pounds	Margin, inches	Turns per layer	Number of layers	Average feet per turn	Feet	Pounds	Margin, inches	Turns per layer	Number of layers	Average feet per turn	Feet	Pounds	Margin, inches
50″	30″	20″	22,060	Round..	5,000	36	16	10.13	5,840	5,300	1.23	43	19	10.15	8,290	5,320	1.26	48	21	10.11	10,200	5,180	1.39	54	24	10.14	13,160	5,300	1.23
				Grooved.	4,500	34	16	10.24	5,580	5,060	0.82	41	19	10.25	7,985	5,120	0.84	46	20	10.11	9,310	4,730	1.40	51	22	10.11	11,340	4,570	1.37
46″	30″	20″	16,280	Round..	4,000	36	12	9.57	4,140	3,755	1.42	43	15	9.65	6,220	3,990	1.09	48	17	9.67	7,890	4,010	1.03	54	19	9.66	9,910	3,992	1.07
				Grooved.	3,500	34	12	9.66	3,945	3,580	1.11	41	14	9.61	5,520	3,540	1.25	46	16	9.66	7,110	3,615	1.12	51	17	9.34	8,100	3,265	1.33
40″	30″	20″	8,540	Round..	2,000	36	7	8.86	2,232	2,025	1.16	43	8	8.82	3,035	1,948	1.32	48	9	8.82	3,810	1,935	1.31	54	10	8.81	4,760	1,918	1.35
				Grooved.	1,500	34	6	8.76	1,788	1,621	1.56	41	8	8.86	2,905	1,867	1.14	46	9	8.87	3,670	1,867	1.13	51	10	8.88	4,530	1,826	1.08
						Diameter—Round, 0.548″ Grooved, 0.574″ Weight, 907.58 lb./1,000′						Diameter—Round, 0.460″ Grooved, 0.482″ Weight, 641.86 lb./1,000′						Diameter—Round, 0.410″ Grooved, 0.430″ Weight, 508.00 lb./1,000′						Diameter—Round, 0.365″ Grooved, 0.392″ Weight, 403.00 lb./1,000′					

Tests For Tin Coated Wire

Three simple chemical tests that reveal pin holes and unprotected areas in tinned steel or iron wire

By J. D. Brunton

Brunton's Research Laboratory, Musselburgh, Scotland

THESE laboratory tests for detecting imperfections in wire coated with tin follow a similar contribution of Mr. Brunton's on chemical tests for zinc coatings. The chief merit of the formulae given and the technique described is the ease with which both can be applied on a small scale without the elaborate technical resources of metallurgical chemists.

THE best protective coating for iron and steel articles is undoubtedly zinc because it is the more electro-positive metal, and we have already described various methods of testing both its durability and its amount if necessary. The other protector is tin, and wires and many articles depend on this metal for their preservation which, although not electro-positive to iron, has a very low solution tension and is known to be practically incorrodible. The great difficulty in the tinning operation is to apply it so as to cover the whole surface in order that pin-holes shall not exist in the coating. This is the great drawback of articles coated with tin, because these small pin-holes, being uncovered, expose the under-steel, and corrosion is very rapid at these points. Fortunately a very good test has been devised and by it any holes are immediately exposed. This test is known as the

Ferrozyl Test

The solution consists of a slightly acid solution of gelatine containing about 1% Hydrochloric acid and is made up as follows.

A 1½ per cent solution of gelatine is made by dissolving a weighed quantity in the correct amount of water. The solution is now boiled for one hour and pure water is added from time to time to make up for loss by evaporation. It is then filtered hot and phenol phtahalein indicator added to the filtrate, after which it is titrated with standard hydrochloric acid or potassium hydroxide, as the case may be, until it is perfectly neutral.

When this stage has been reached, hydrochloric acid is added at the rate of 1 cc. per 100 cc. of solution and also 7 cc. of a 1% solution potassium ferricyanide per 100 cc. and the reagent, which is still hot, is ready for use. For the test a sufficient quantity of the reagent is poured into a small dish to cover the bottom and this is allowed to cool and form a jelly. The coated article, after being freed from grease or oil by washing in petrol or benzine, is placed on the bed of jelly and covered with the hot solution, which is then allowed to cool. Sometimes the color shows up immediately, but it is usual to allow 20 hours or so.

The mounts may be preserved for many months by keeping the gelatine covered with alcohol. Any holes in the coating of the article are at once attacked by the solution and little blue dots can be noticed here and there. The explanation of this is that the iron exposed at these holes is attacked by the solution and forms ferrous iron, which, when in contact with ferricyanide forms the well known Turnbull's blue. The gelatine simply acts as a stiffener for the reagent, diffusion is prevented and the effects produced are preserved.

No Test for Thickness

It will be seen that this test is very similar to the Caustic Soda test for galvanized or zinc coated articles in that it readily shows any defects existing in the coating, but as a measurement of the coating it is of no use. Unlike zinc coatings, tests for tin coatings are not very numerous, this being due to the vast difference in solution properties of the two metals, but of late two tests have been used by Messrs. Bruntons with satisfactory results.

One, though not so good, is very similar to the Preece Copper Sulphate test in that the parts of the articles with the least coating are the first to be revealed.

The Dipping Test

The second is a quantitative test based on the familiar test for tin by titration with Iodine.

The first test called the *"Dipping Test for Tinned Wires"* consists of stripping the wire by immersing in hydrochloric acid until all the tin is dissolved. The length of time the action is allowed to go on in each case is one minute, after which time the wire is placed in a very weak solution of copper sulphate. The copper sulphate does not deposit on the tin, but immediately iron is exposed copper is deposited.

The solutions required are:—

Hydrochloric Acid of Specific Gravity 109, made by mixing approximately 50 cc. acid of Specific Gravity 1.16 with 50 cc. water.

Copper Sulphate Solution:—Dissolve 5 grams copper sulphate crystals in water and make up to 100 cc. Neutralize with a small amount of copper oxide and filter for use.

Copper Polysulphide Solution:—Make a saturated solution of sodium sulphide and to this add flowers of sulphur to the amount of 250 grams per litre of solution, then filter. This solution should be freshly made up for each test.

Method:—The test is based on

the fact that tinned wire does not take a copper coat in a weak neutral solution of copper sulphate. Iron, on the other hand, coats immediately.

The wire is cleaned by washing well in petrol or benzine and wiped dry with a clean cloth. It is now immersed in hydrochloric acid of Specific Gravity 1.09 for one minute, washed thoroughly in running water, and wiped dry. Immerse in copper sulphate solution for 5 seconds, wash well and wipe dry. Again immerse in hydrochloric acid for one minute, wash well and wipe dry. Immerse in copper sulphate for 5 seconds, wash and wipe dry. Repeat as above, carefully washing and wiping after each immersion, until the wire is coated with copper, which will take place immediately all tin is removed. Should there be any doubt as to wire being coated or not, immerse the wire in polysulphide solution for a second. If copper be present the wire will blacken immediately, due to formation of copper sulphide.

A slight yellowish color is often visible which might be mistaken for a slight trace of copper, but on again placing the wire in the acid solution this yellowish color disappears, whereas the copper coat, when once deposited, shows up sharply defined and remains so when left immersed in the acid for a considerable time. The copper is only very slightly soluble in hydrochloric acid and, on this account, re-immersion in the acid is a very good way of making sure that copper is deposited and is equally as good as the Polysulphide Test.

An Immersion Test

Another test has been devised by the Cable Companies and is issued as a test for tinned steel wire. A piece of the wire is carefully freed of any grease or oil by thoroughly cleaning in petrol or benzine, dried and immersed in hydrochloric acid of Specific Gravity 1.088 for one minute at 15° C. It is then rinsed in distilled water, immersed in a sodium sulphide solution of Specific Gravity 1.142 for one minute, and washed again. These operations are repeated until the surface of the steel appears, which turns black in the sodium sulphide solution due to the formation of iron sulphide, the number of immersions being taken as a measure of the depth of the coating.

The immersion tests just described are very similar to the Preece Copper Sulphate test for galvanized wire but, although they give us some idea of the depth of the coatings, they furnish no means of estimating the amount of tin present in the coating. Unfortunately tin cannot be tested quantitatively as easily as zinc. There is no French Government or Lead Acetate test but a very good method is available which, though perhaps not quite as simple as the latter, is not very difficult.

The Iodine Test

The estimation of tin by titration with iodine and the starch indicator is well known to the analytical chemist. This test provides a quantitative test and the amount of tin coating on tin coated articles can be determined in a few minutes, the results being very near the truth.

Five grams of the wire or of any article under test are taken and placed in a small flask carrying a stopper with a bunsen valve attached. Add 50 cc. hydrochloric acid of Specific Gravity 1.09, replace the stopper and allow it to simmer on the hot plate. After three or four minutes in the hot acid solution all the tin is dissolved and the liquid immediately poured off into another flask, care being taken to prevent the liquid coming into contact with the air any longer than possible. The undissolved iron is left behind in the first flask. A fragment of marble is now added to the liquid and it is immediately cooled off under the tap. When cold add a few ccs. of starch indicator and titrate quickly with a standard solution of iodine until a permanent blue color is reached.

1 cc. iodine=.01% tin working on a 5 grams sample.

Therefore, % tin=number of ccs. of iodine used X .01.

Solutions required:—

Hydrochloric Acid — Specific Gravity 109.

Make by mixing 1 volume of hydrochloric acid, Specific Gravity 1.16, with 1 volume of water.

Starch Solution.

Make up 1 gram of soluble starch into a thin paste with cold water, pour into 100 ccs. of boiling water and boil for five minutes. Allow to settle, cool and decant off clear liquid.

Standard Iodine.

Weigh off 1.066 grams iodine and 2.5 grams potassium iodide and dissolve with the minimum quantity of water. Standardize with pure tin.

1 cc.=.0005 grams tin.

This provides an easy method of estimating the percentage of tin actually present, and by simple calculation the amount of tin per square foot, or whatever is required, can be found.

Summary of Tests

From the above tests we can sum up as follows:—

1. The Ferroxyl Test is extremely useful for exposing any unprotected iron and from this test it is possible to form some idea of how the article will withstand conditions of service. This test as applied to tinned articles is very similar to the caustic soda test as applied to zinc coatings, in that both are used to detect any uncoated areas. The Ferroxyl test, however, is of much more importance in this respect than the Caustic Soda one. If in a galvanized article there are certain areas which are not coated with zinc and which, therefore, leave the iron exposed, corrosion does not take place at these areas until all the zinc has been removed. This accounts for the great preserving properties of zinc. It enacts the role of self-sacrifice to the protection of the iron. In tinned coatings, however, the opposite occurs; any areas not covered with tin are quickly corroded,

(*Please turn to page 425*)

How To Splice Wire Rope

With the help of suitable tools and equipment, any competent mechanic can do a satisfactory splicing job

By Oscar Hellgren

Wire Rope Splicer, Youngstown Sheet & Tube Co.

PERHAPS the first principle that should be set forth in a paper on this subject is: *Do not splice worn ropes.* Any service that might be obtained from a spliced worn rope will not be worth the trouble and expense of splicing, to say nothing of the increased hazard to workmen through the operation of an unreliable rope.

The tools needed for splicing rope are simple and few, they being:

1—14″ or 16″ Carew cutter, heavy nipper type
1—12″ tapered Marline spike of tempered steel, 1″ thick at the heavy end and with a flat, thin point
1—7″ tapered spike of tempered steel with ground handle. This may be made of a ⅜″ round "rattail" file, annealed and ground smooth with point flattened, then retempered
1—Medium sized, portable vise
1—Short bladed, sharp pointed knife
1—Small bar, or lever, of wood (hickory)
6 feet of ½″ hemp rope for a sling
Small quantity of soft wire and a roll of electrician's tape.

This set of tools will apply to the splicing of rope 1″ or smaller in diameter. Larger diameter ropes require no more tools; merely the same as those listed above, only heavier.

As a guide to the proper amount of extra rope needed for "long" or "endless" splicing of 6x19 construction, the following table is given:

Rope Diameter Footage allowed for splicing.

⅜ inch	15 feet
½ inch	15 feet
⅝ inch	20 feet
¾ inch	24 feet
⅞ inch	28 feet
1 inch	32 feet
1-⅛ inch	36 feet
1-¼ inch	40 feet
1-½ feet	45 feet

The accompanying illustration, taken from the U. S. Bureau of Standards, shows the progressive steps involved in splicing wire rope. Because there is so much that is not told in this illustration, however, a typical job of splicing will be described, using as the example a ¾″, 6x19 preformed wire rope.

As indicated above, the extra cable required for a splice of this kind is 24 feet. This means that 12 feet of each rope end will be devoted to the work of splicing. These two 12 foot ends are prepared exactly alike. In the example cited no tie wires are necessary because preformed wire rope lies flat and will not fly apart when cut. With ordinary wire rope it would be necessary to tightly seize each rope 12 feet from the end, then in addition apply a temporary tie wire about one foot from the rope ends to permit seizing the individual strands as they are unlaid.

In the example set up, however, it is merely necessary to unlay the six strands to a depth of 12 feet and, after cutting away the hemp core, place the two unlaid ends together, with the strands alternating as shown in Figs. 2 and 3.

First Lay Most Important

The next step in splicing rope is to do what is shown as having ben done in Fig. 4., to unlay one strand and lay in the corresponding strand from the opposing rope. This is perhaps the most important step in making a good splice. Ordinary rope, more particularly than preformed rope, has a tendency to twist, thereby refusing to permit the first strand to confrom exactly to groove left by the unlaid strand. Wherever this is noted the work of laying in the strand should be stopped and an adjustment made in the way the two unlaid ends (See Fig. 2) butt together.

With the first lay properly adjusted and laid in, all successive strands will fit easily and readily into their correct position. Constant care should be exercised, however, to see each strand does not in any way untwist or lose the helical curve that was given it at the time of the rope's manufacture. It is very poor practice to unlay one strand far ahead of the strand being laid in. Rather, strand "a" should be unlaid only as rapidly as strand "A" is laid in both operations proceeding together—slowly, carefully and with constant pressing and adjustments that will make the inserted strand fit perfectly into the groove left by the unlaid strand. The first strand is laid to within one foot of its length, after which the strand just removed is cut away, save for a 12-inch length. Tie these two one-foot lengths together and to the rope with a ravel from the hemp center. This is necessary to prevent the strands unwinding while the rope is being handled for the remaining strands.

After the first strand has been laid into each end, proceed with successive strands, stopping each lay about 30 inches from the point where the previous strand was stopped. This 30-inch spacing of strand ends

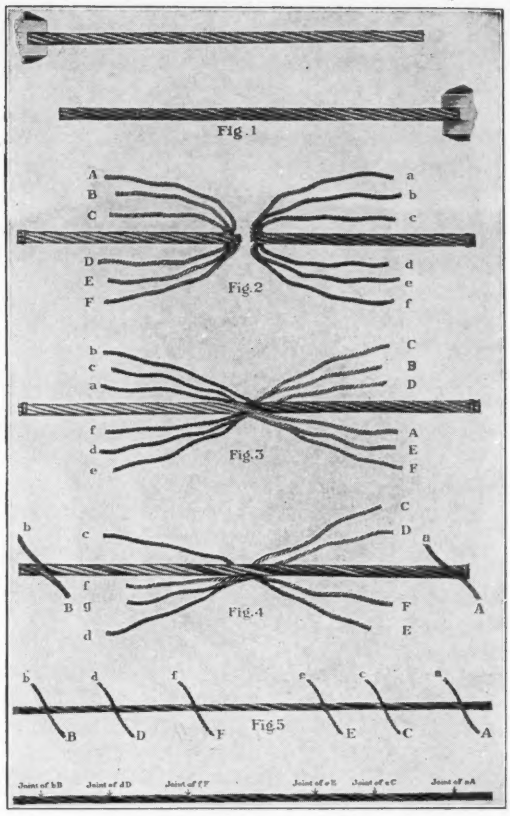
is recommended for ¾" rope. Naturally, the spacing and length of ends will vary proportionately with the different sizes of rope. This will give, in the end, a rope that will have an appearance similar to Fig. 5.

Tucking In the Ends

Before starting the final step of tucking the 12 ends into the center of the rope, wrap each strand end with electrician's tape. This wrapping will serve a double purpose. It will increase the diameter of the strand to the same size as the hemp center it replaces, and will act as a cushion that will prevent internal wear against the overlying strands. If adhesive tape is not available the strand ends may be tightly wrapped with ravelings from the discarded hemp center.

It is also advisable, as a preparatory measure, to bend the 12-inch ends of each strand back sharply upon itself, thereby creating a kink in the strand close to the rope at the point where the strand ends have been crossed. In addition to kinking, untwist the strand at this point until it is quite flat and the 19 wires in the strand have been separated. When this kink has been partly straightened back the strand end may be tucked into the center of the rope in the same direction as it is laid and will allow the strand ends to taper away from each other at the point of tuck, thereby preventing any bulge or enlargement of diameter in the finished rope. Also, when properly done, this form of tapered, kinked end, prevents the tuck from creeping.

In the actual work of tucking the strands, place the cable in a vise as indicated in the illustration. Now fasten the hemp sling and lever around the cable in such a way as will open the rope when leverage is applied. Once the rope has been twisted open, insert the short spike under two or three strands. Now insert the large spike right alongside the smaller one. Rotating this large spike will further open the rope, after which the small spike may



An illustration showing the progressive steps involved in splicing wire rope Fig. 1 shows the pieces of cable to be spliced held firmly in a vise ready for the subsequent operations described in detail in the text. The finished job is pictured below Fig. 5.

be used to pick out the hemp center for cutting.

Having cut the hemp center and pulled out the ends, insert the large spike still further into the rope. Now work into the center of the rope the strand ends, trimming the hemp center flush with the strand end. Care should be exercised to remove no more hemp than is absolutely necessary.

The large spike may now be replaced with the smaller ane which is used to hold the strand end and hemp in place while the lever is released and the rope closed. After carefully removing the small spike the last operation is to flex the rope with the hands to compel both center and outside strands to fit into their assigned positions.

So much wire rope is in use by practically every industry that nearly every industrial company should have in its employ at least one good mechanic who is qualified to do this work. It may be learned and performed by any mechanically minded workman but, of course, practice and care are necessary to make a good, dependable splice. It will be found in actual splicing practice that the preformed type of rope will handle much easier than the ordinary type of rope.

Current prices for labor for splicing wire rope endless are about as follows:

Less than ½" diameter ropes	$5.00
⅝" diameter ropes	6.00
¾" diameter ropes	700
⅞" diameter ropes	7.50
1 " diameter ropes	8.00
1-¼" diameter ropes	9.00—10.00
1-½" diameter ropes	10.00—12.00

These labor prices will, of course, vary with geographical location and local labor conditions and cover labor charges only. The figures do not include the additional 15 or 45 feet of rope required, necessary tools, or other costs.

Silver Plating Copper Wire

Modern foreign practice in cleaning, continuous low tension electro-plating, and regulating the thickness of deposit

Published by arrangement with "Draht-Welt", Halle a. d. S., Germany

THE various kinds of copper wire silver plated by means of the galvanic process are used for making spun wire and silver tinsel, in the electrotechnical industry for making fuse wire, and also for making music instrument strings.

The characteristics or distinctive features depend essentially on the use to which they are to be put, but generally, the silver-coating must have the greatest possible durability; it must adhere perfectly to the copper wire and have an absolutely white color. In numerous cases, the consumers require the designation of the silver fineness or percentage. Above all, the silver coating must hold out when the silver plated wire is submitted to the drawing-process. The following rules must be observed for obtaining a perfect silver coating.

Plant Equipment

A galvanic silver-plating plant comprises:

1. The unwinding device.
2. The bath for ungreasing and cleaning the wire.
3. The silver bath.
4. The winding device.

The process for cleaning the wire and removing the grease out of it can take place either separately or in one operation together with the silver plating process. For various reasons which are set forth in the course of this article, we begin with the description of the latter.

The wire is unwound from rings or spools according to its thickness and passes through the ungreasing and cleaning bath: it then passes through a washing bath before passing through the silver bath. After having been silver plated, it passes again through a second washing bath and is wound on a reel or on spools after it has been conveniently dried.

Arrangement of Spools

The thickness of the wire to be silver plated is generally about 1 mm. Although the working process with the help of reels does not meet with any difficulty, preference is to be given to spools, as interruptions are practically out of question, while the wire is caught frequently by the rings. The tension of the wire must always be regular when the latter runs through the baths. A regular tension can be easily obtained by making use of rolls.

As annealed wire even when it has been brought to the highest temperature, is never absolutely pure in metallic respect, it must be drawn before being submitted to the silver plating process, whereupon it can be directly wound on the rolls. When polishing the wire, the quantity of grease used during this operation must be exceedingly small, because the grease must be entirely removed before the wire passes through the silver-bath; a large quantity of grease needlessly spoils the bath-solution and the latter must be soon renewed. For these reasons, it is better to draw (last drawing) the wire in ungreased state.

The spools should preferably be placed in horizontal position, so that the wire cannot entangle when it breaks and falls down on the running bench. As the running speed of the wire is very slow, the supports can be constructed wtih light materials, but each of the spools must be provided with a brake; besides, they must be located in such a way that they can be changed without being obliged to stop the other spools.

The galvanic silver plating plants are generally built for simultaneous plating. A plant for about 10 wires should meet all requirements of the practice. We recommend that several places be left free on the runing bench. This arrangement allows a quick and easy change of the spools during the operation. The silver plating process must last as long as possible without being interrupted. All interruptions are the cause of a bad silver plating; the defects have disagreeable consequences during the fine drawing process. For this reason, the wire must be conveniently guided from the unwinding device to the winding device, so as to prevent entanglement, breaking, and consequently all interruptions in service.

Cleaning Methods

The wire can be ungreased and cleaned in different manners. While the old ungreasing process was a chemical process similar to pickling, the new ungreasing process is an electrolytic one. The wire runs here over contact rolls through a potassium hydrate bath or through a potash bath containing steel anodes. The bath is heated and its temperature is maintained at 80° C. A strong low-tension current of about 0.2 Amp./cm^2 of wire surface; that is, about 6 Amp. per each wire of 1mm

diameter and for a length of bath of 1 meter causes an intense formation of hydrogen bubbles which detach the grease adhering to the wire surface. The lye saponifies the grease (that is, the grease turns to soap) and the lather swims at the surface of the bath, where it can be skimmed off from time to time.

The electrolytically cleaned wire is not yet absolutely clean; some impurities still stick on its surface. When coming out of the ungreasing bath, a part of the saponified residues swimming at the bath surface may possibly cover the wire and make a perfect silver plating impossible; but the most important thing is that the silver bath is rapidly spoiled and becomes useless. The wire must therefore be carefully rinsed and cleaned by mechanical means.

Mechanical Cleaning

The mechanical cleaning can be realized by means of two felt rolls located in the bath. The wire runs between these rolls and the latter clean it conveniently. The same results can be obtained when the wire runs through a long tank filled with rough sand. The wire passes then through flowing water and leaves the sand which still adheres to its surface as well as the lye which covers the sand. The latter must be frequently renewed as soon as it becomes greasy.

We must still mention a better mechanical cleaning process. As soon as the wire has left the ungreasing bath, it passes through a die which strips off the last residue of lye and all other impurities which could still adhere to its surface. But, as this cleaning process does not permit of tying the wire easily when changing the spools, we recommend using it only when cleaning and silver plating are performed separately, i. e., in large plants.

The wire having been cleaned in that way has a delicate surface and must be silver plated as soon as possible. It frequently happens that the wire having been kept in stock during one day becomes absolutely useless for silver plating. The preference is therefore to be given to the combined ungreasing and silver plating process.

The cleaned wire is then submitted to the silver plating process. The wire runs—just as through the ungreasing bath—over contact rolls through the silver bath. The latter is composed of cyanide of potassium and silver (this solution is to be had in commerce as salts or ready for use). The anodes of pure silver are generally plates of 4 mm. thickness and are located at equal distances and parallel with the running wire; the anodes are hanging in the bath. The wire runs between the anodes. When plating several wires, the medium distance between the wire and the anodes must be as equal as possible, because the action exerted by the current on each wire depends on this distance (consequently the quantity of precipitated silver depends also on that distance).

The current density cannot be increased at will when perfect adherence of the silver coating is desired. When the current density is too considerable, the precipitated silver is somewhat spongy and the coating scales off when it is submitted to the slightest mechanical strain. For this reason, it is preferable to work with an approximate machine tension of 1 volt and with a current density of 0.05 amp/cm^2 of wire surface.

Low Tension Plating

The tension of 1 volt is only an approximate value. The voltage depends essentially on the resistances encountered in the wire and in the bath. The latter depend on the distance between the anodes and the wires, on the degree of concentration and temperature of the bath, etc. The current intensity is only decisive for the quantity of precipitated silver; this intensity must therefore be controlled without interruption. The low tension current used for ungreasing and silver plating the wire is produced by two separated low tension direct current generators. The capacity of these generators depends on the number of wires and on the current intensity required for each wire.

The last particles of silver solution which still adhere to the wire when the latter leaves the bath are now dissolved in a hot water bath in the following way. As the washing water is poured again into the silver bath the loss of silver is very trifling. When the wire has been cleaned, it then passes through a drying device; finally it is wound up.

The Winding Mechanism

The winding device comprises two parts; the winding drum and the rinsing device. As the wire must run at a certain constant sped for getting a coating of a certain thickness, it is first guided round the driving drum, so that the peripheric difference between the full spool and the empty spool has no influence on the running speed of the wire.

The thickness of the silver coating can be regulated in two different ways; either through modifying the current intensity, or through modifying the running speed of the wire.

We recommend keeping the coating thickness as constant as possible and to regulate the running speed. The driving mechanism of the winding device and especially that of the driving drum must be adjustable within the widest limits. For this purpose, cone pulleys or a double cone drive are frequently used.

For the determination of the capacity, we must apply the fundamental electro-galvanic law used for all galvanic processes:

$$M = M.\ J.\ t \qquad (1)$$

in which:

M represents the quantity of precipitated metal,

t the time,

M a constant depending on the units of measure which have been chosen and on the nature of the separated metal (in this case, silver). It represents the

(*Please turn to page 421*)

NEWS *of the* INDUSTRY

Foreign Trade Opportunities

FOREIGN trade opportunities reported by the U. S. Bureau of Foreign and Domestic Commerce during the month of November include inquiries from the following sources: For iron hoops and wire nails (34323) from Cawnpore, India; for galvanized wire (34322) from Calcutta, India; for wire-weaving machinery for bed spring manufacture (34282) from Dublin, Ireland; for metal-netting manufacturing machinery (34428) from Montevideo, Uruguay; for industrial machinery, small, all kinds (34375) from Villa Maria, Argentina; for copper wire (34382) from Groningen, Netherlands for fencing, protective, for roadways (34567) from Cape Town, South Africa; for barbed wire (34547) from Habana, Cuba; for tungsten filaments (34680) from Luxemburg, Luxemburg; for wiring equipment and electric light bulbs (34646) from Valparaiso, Chile; for bolts, nuts, rivets, brass screws and files (34690) from Bombay, India; for nails and wood screws (34626) from Manila, P. I.; for barbed wire (34758) from Ceara, Brazil; for galvanized barbed wire (34690) from Bombay, India.

Welded Chain Simplified

A SIMPLIFIED practice recommendation for welded chain was approved at a general conference of manufacturers, distributors and users, held on November 16 at the Department of Commerce under the auspices of the Division of Simplified Practice. The recommendation was voted to become effective on February 1, 1929, for new production, and on May 1, 1929, for current stocks in the hands of jobbers and retailers. It is estimated that about one-third of the existing list of standard or stock sizes will be eliminated. A complete list of the varieties and sizes provided for in the elimination program may be obtained from the Division.

Tack and Nail Standardization

THE simplified practice recommendations for cut tacks and small cut nails are now in effect. Signed acceptances from manufacturers, distributors and users numbering 80 per cent or more of the industry by annual volume of production have been received by the Department of Commerce. The simplification, recently revised by the industry, originally reduced the variety of sizes from 421 to 182 and packing weights from 423 to 121.

Improve Submarine Cable

THE American Telephone & Telegraph Company announces that it has perfected a very sensitive submarine cable which will make it possible for the first time to secure effective telephone communication by cable between the United States and England. It is stated that the new cable promises more reliable service than that given by the best wireless methods known. In conjunction with the British Post Office the company has decided to install additional transmitters in the present equipment, which now has two speech channels. It is hoped that a third will be available for service about July, 1929, and a fourth is under consideration for a later date.

To Standardize Engineering Terms

A TENTATIVE American Standard in Abreviations for Scientific and Engineering Terms has recently been completed by a special committee of the American Society of Mechanical Engineers and is now available for inspection and criticism. The committee personnel consists of 39 men representing 37 national organizations composed of manufacturers, consumers and general interests. Comments and criticism of the tentative draft will be welcomed by the A. S. M. E. Mr. C. B. LePage is Assistant Secretary, with offices at 29 West 39th Street, New York City.

Annual Oakite Meeting

COMPLETING twenty years of industrial cleaning service, the technical staff, field service men and executives comprising the organization of Oakite Products, Inc., met in the general offices in New York, November 14 to 17, on the occasion of their annual sales conference. District managers and representatives from thirty-three states and Canada came together in daily discussion, subjects of which ranged from the cleaning of watch crystals to ocean liners, silk stockings and eighty-thousand-barrel oil storage tanks. One of the interesting phases of the convention was the demonstration of paint stripping on the side of a full-sized locomotive tender, the operation being performed by apparatus designed and built by the service department of Oakite Products, Inc. Nineteen papers were read on technical, sales and service topics followed by informal discussion and interchange of experiences.

New International Bridge

A PRELIMINARY survey has been made of the proposed international bridge over the St. Lawrence River from Brockville, Ontario, to a point approximately two miles west of Morristown, New York. The plans provide for a steel and concrete structure more than a mile in length, including ap-

proaches. The three propositions under consideration include a highway bridge to cost about $5,000,000; a highway bridge plus single track railway track to cost approximately $9,000,000; and a two-track highway bridge to cost approximately $12,000,000. They will be built by the St. Lawrence Bridge Company, Ltd., Brockville, Ontario.

Manitoba Bridge and Iron Works, Ltd., Winnipeg, Canada, has been awarded contract by the Canadian National Railways for the fabrication and erection of a bridge over the Minnewashta Creek near Miniota, Manitoba, on the main line between Winnipeg and Saskatoon. It is estimated that the cost of steel work alone will amount to about $300,000.

Building and Expansion

American Brass Company, Waterbury, Conn., is rebuilding the electrical cable plant at Hastings, New York, formerly occupied by the National Conduit & Cable Co. Equipment will include new insulating and impregnating machinery.

National Foundry & Machine Co., Worcester, Mass., manufacturers of wire drawing dies, is erecting a new factory unit to accomodate increasing business.

Standard Wire & Iron Works Co., Philadelphia, Pa., has purchased a two-story factory for additional space.

Nachman Spring-Filled Co., 2241 South Halsted Street, Chicago, has purchased and will consolidate the businesses of National Wire Spring Co. and Marshall Spring Co.

American Coil Spring Co. will not remove, as previously reported, to Muskegon, Michigan. The projected new factory unit at Muskegon is part of an expansion program that will in no way affect the operations of the Chicago factory at 1455 West 37th Street.

COMING EVENTS

Dec. 3-7. Annual meeting of the American Society of Mechanical Engineers, Engineering Societies Building, New York City. Calvin W. Rice, secretary, 29 W. 39th St., New York City.

Dec. 6. Annual meeting of the Power Transmission Association at Hotel Commodore, New York City. W. S. Hays, 644 Drexel Bldg., Philadelphia, Pa., executive secretary.

Dec. 3-8. National Exposition, Power and Mechanical Engineering, at New York. Secretary, C. Roth, 480 Lexington Avenue, New York City.

Dec. 1-9. Aeronautical Exposition, Coliseum, Chicago.

Dec. 12-14. International Air Conference, Washington, D. C.

Jan. 5-12. National Auto Show, Grand Central Palace, New York.

Jan. 14-18. American Society for Steel Treating, Semi-Annual Meeting, Los Angeles, California.

Jan. 14-18. National Metal Congress, Los Angeles, California.

Jan. 15-18. Society of Automotive Engineers. Annual Meeting, Book-Cadillac Hotel, Detroit, Michigan. Coker F. Clarkson, Secretary, 29 W. 39th St., N. Y. C.

Feb. 12-15. Chicago Power Show and Midwestern Engineering Exposition at Chicago. Secretary G. E. Pfisterer, 53 W. Jackson Blvd., Chicago.

Andrews Wire & Iron Works, Rock Island, Illinois, has awarded a building contract for a new factory addition and equipment to cost approximately $80,000.

Cozens Spring Service, Wood Street, Toronto, manufacturers and repairers of automobile springs, is building a new plant at an estimated cost of $50,000.

B. J. Coughlin Co., Ltd., 2050 Ontario Street East, Montreal, manufacturers of automobile and railway springs, is building and equipping additional plant space.

Atlas Manufacturing Co., New Haven, Conn., manufacturers of wire products and hardware specialties, has acquired Ansonia Novelty Co., Ansonia, Conn., and will remove the business of the latter to its New Haven plant.

Southern New England Electric Co., Waterbury, Conn., are planning additional plant facilities to cost approximately $30,000.

Standard Electric Stove Co., Twelfth and Fifth Streets, Toledo, Ohio, plan to build and equip additional factory space at an estimated cost of $85,000.

Defiance Screw Machine Products Co., Defiance, Ohio, will build and equip additional factory space at an estimated cost of $30,000.

Canada Wire & Iron Goods, Ltd., 180 King William St., Hamilton, Ontario, is building an addition to its manufacturing plant.

Chelsea Screw Co., Chelsea, Michigan, has been absorbed by Federal Screw Works, 3401 Martin Street, Detroit, and will hereafter be styled Chelsea Division of the latter company.

Restmore Mfg., Ltd., 1000 Parker Street, Vancouver, B. C., manufacturer of woven wire furniture springs, has awarded contract for a factory addition to cost approximately $25,000.

Contract has been awarded to the firm of W. I. Bishop, contractors, Montreal, Quebec, for the erection of a power plant at Cedar Rapids, on the Lievre River, Quebec, at an estimated cost of about $5,000,000.

General contract has been awarded by Ross Keeler Electric Company, Sherbrooke, Quebec, for a new three-story business building to cost about $50,000.

H. E. Salzberg & Co., Inc., 255 Broadway, New York City, manufacturers of electrical machinery, has leased a factory building in Jersey City, N. J., for rebuilding and repair work.

Whiskette Mfg. Co., Terre Hill, Penna., is installing machinery and equipment for the manufacture of steel wool products, rotary brushes and brush cleaning devices.

Sleeper & Hartley
TRADE MARK

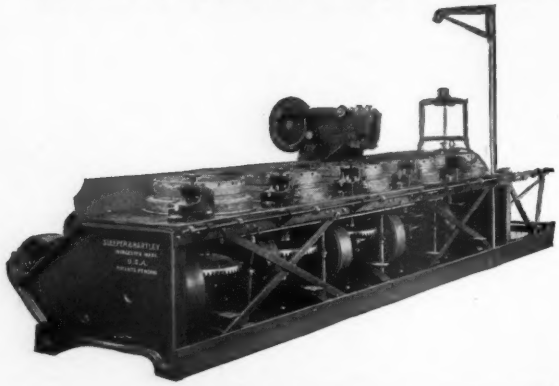
Practical Continuous Wire

These Machines Go Into Production at [illegible]—R

Rod Frame

(No. 5—14 or 15 wire)
Patented June 3, 1924—May 12, 1925—others pending

All Ball or Roller Bearings
No Differential Gearing.
Automatic Compensation for Speeds of Heads.



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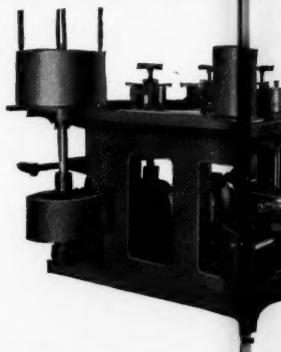
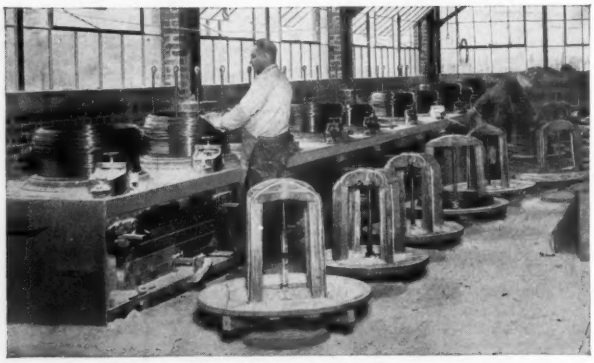
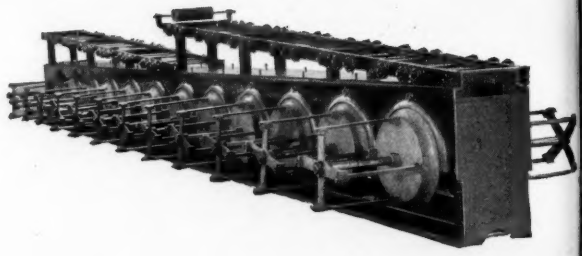


IMPROVED WIRE MILL EQUIP[illegible]



Standard Rod Frame—10 Block

Long, Stiff Spindles, in anti-friction bearings, and equipped with friction Clutches. Powerful and reliable.
Practically noiseless in operation.
(New Plant of Thompson Wire Co., Worcester, Mass.)



Patenting Furnace Take-Up

(New Plant of Thompson Wire Co., Worcester, Mass.)

AGENTS: CHICAGO TERRITORY, Neff, Kohlbusch & Bissell, Inc. SAN FRANCISCO AND LOS ANGELES Louis G. Henes

SLEEPER & [illegible]

FOREIGN AGENTS AND REPRESENTATIVES: UNITED KINGDOM—Mr. Fredk. A. Perry, 63 Queen Victoria St., London, E. C. 4. FRANCE—Mr. Edgar Bloxham, 12 Rue du Delta, Paris. BELGIUM—Isbecque, Todd & Cie., 25-27 Boul. Emile Bockstael, Brussels. MONTREAL AND TORONTO—Arthur Jackson Machine Tool Co.

WORCESTER[illegible]

Wire Drawing Machinery

Sleeper & Hartley TRADE MARK
REG. U.S. PAT. OFF. & PRINCIPAL FOREIGN COUNTRIES

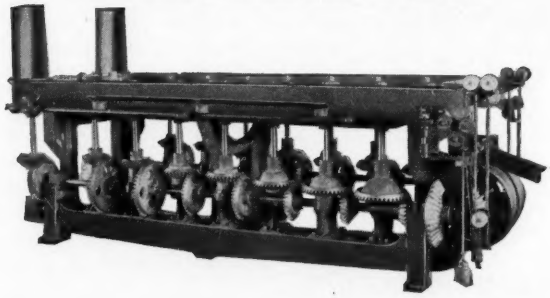
at Low Cost—Reducing Overhead-Increasing Production!!

Double 8-Draft Fine Wire: Wet

No. 22 to 36. High or low carbon wire.

6 Blocks to Average Operator, 22-33, 8-hole, 660 lbs. per day of ten hours.

Many thousands of these heads in operation



Double 8-Draft Fine Wire: Dry

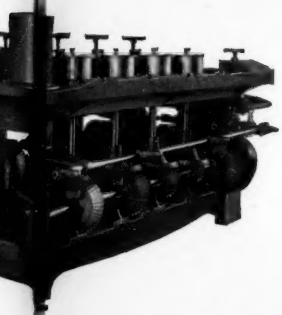
No. 23. High or low carbon wire.

6 Blocks to Average Operator.

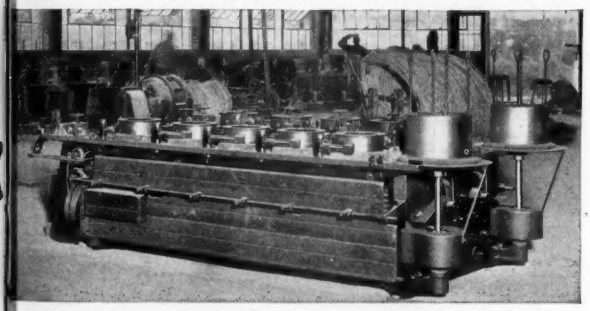
No. 4 to 400 lbs. per block.

No. 5 to 100 lbs. per block.

Many of improved model in operation



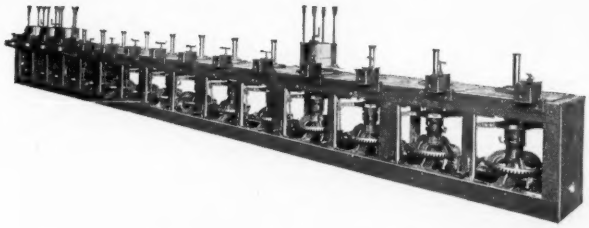
EQUIPMENT RECENTLY INSTALLED



Double Six—Draft Dry Continuous For High Carbon Wire

Direct driven with silent chain. Cut gears throughout. Anti-friction bearings. Variable speed for finishing block.

(New Plant of Thompson Wire Co., Worcester, Mass.)



Heavy 16" Frame For .65 Carbon Wire No. 10½ to .037"

15 Blocks: Motor driven. Silent chain. Anti friction bearings and cut gears throughout.

(New Plant of Johnson Steel & Wire Co., Worcester, Mass.)

SLEEPER & HARTLEY, Inc.

Agents: Philadelphia Territory
Swind Machinery Co.

ITALY—Henry Coe & Clerici, Milan. AUSTRALIA AND NEW ZEALAND—Edwin Wood Pty., Ltd., Melbourne.
JAPAN—Andrews & George Co., Toyko. SWEDEN AN D FINLAND—Maskinaktiebolaget Karlebo, Stockholm.

WORCESTER, MASS., U. S. A.

Manufacture, Technology and Testing of Insulated Wires

A brief history of covered wires for telephone, telegraph and power cable use and a description of current practice in making them

By Charles R. Boggs

*Factory Manager, Simplex Wire and Cable Company**

THE history of insulated wire does not go farther back than early in the nineteenth century but copper wire was drawn as early as the 14th century for various uses. It was not until 1812, however, that there was used in Russia an insulated wire for exploding a mine.

The next record of insulated wire was in 1817 when it was prepared only in a very crude way. In 1835 the invention of the Morse ticker for telegraph gave a great impetus to the use of insulated wire. In 1841 a cable was laid across New York Harbor and in 1845 the first lead covered cable was constructed. This cable was made by covering the wires with rope soaked in tar, which was then pulled into the lead pipe covering. This type of cable proved inefficient.

First Insulated Wire

In the period between 1847-1849 Siemens made the first use of gutta percha as insulation by cutting the gutta percha into strips and wrapping it around the wire lengthwise. The first trans-Atlantic cable was started in 1853 and on this cable gutta percha was used. Even to this day all transoceanic submarine cables use gutta percha instead of rubber for insulation. This cable broke during laying and in 1866 the first successful trans-Atlantic cable was laid.

The telephone was first shown at the Philadelphia exposition in 1876 by Bell and in 1877 Edison produced a successful electric light bulb. Both of these inventions of course made use of insulated wires. Early in the '80's, Habirshaw started to insulate wire with vulcanized rubber and in 1887 the Simplex Company was organized, the first insulated wire being produced in 1889.

Types of Insulation

The kinds and uses of cables are roughly divided into telegraph and telephone cables and power cables. Under these heads are all kinds of wires for power transmission, submarine, household and industrial uses. The power cables are differently made for high and low voltages, the high voltage cables offering serious problems of construction.

Insulation falls into four separate types: (1) Varnished cambric—the consumption of this type of insulated wire is small for it has bad dielectric properties; (2) Paper insulation—used on power and high voltage cables. This type is efficient and has a low cost. (3) Gutta Percha—not used for ordinary wires for it oxidizes easily and softens and hardens under the influence of temperature. Used largely on trans-Atlantic cables made in England. (4) Rubber—this material is efficient, does not soften, is flexible, waterproof and has good electrical properties. The only objection to its use up to this time has been its lack of permanency due to oxidation. This can be prevented to a large extent by the use of the outer coverings and by the incorporation of anti-oxidants in the compound.

The rubber content of rubber insulation varies from zero to 80% according to the use to which the finished cable is to be put. Abrasion, waterproofing properties, flexibility, etc., are some of the factors to be considered in the compound used. Tests on insulated wire include the normal physical tests as well as general electrical tests to determine the soundness and dielectric properties of the insulation.

An electrical research laboratory is also a necessary part of a modern insulated wire plant. An interesting feature of the testing in such a plant is the necessity of making tests after every operation so that each successive step is properly controlled.

Protective Coverings

Protective coverings for insulated wires and cables generally used are fibrous braids, lead, steel, rubber and other special types. Braids are used for mechanical protection and if weatherproofed, to protect against the weather, etc. Lead covering is used to keep out water and air but it is too heavy for general use. Steel is used for mechanical protection in flat band or galvanized armor wire which also serves to give tensile strength. Rubber, of course, is used on account of its ability to resist abrasion, its flexibility and to exclude water and air. Special protection coverings vary according to the types of wires and uses to which they are to be put.

The equipment and machinery necessary for manufacturing insulated wires differs in some respects from the type of machin-

(*Please turn to page 423*)

*An article based on an address made at the October meeting of New York Group, Rubber Division, A. C. S., and reported by "The Rubber Age".

DIGEST OF RECENT TRADE LITERATURE

Laboratory Experiments on High Temperature Resistance Alloys. Bulletin No. 466, The Institute of Metals (London).

A communication from the staff of the research laboratories of the General Electric Co., Ltd., Wembley, England. A series of nickel-chromium alloy containing from 10 to 60 per cent of chromium, and a few ternary alloys containing tungsten and molybdenum were made from specially pure materials melted in hydrogen. They were subjected, together with some commercial nickel-chromium alloys, to new forms of tests for resistance to oxidization and resistance to sag, at high temperatures. For the binary alloys resistance to oxidation increases with increase in chromium content up to 30 per cent. With more than 40 per cent of chromium a second phase appears and resistance to oxidation falls. Ternary alloys containing only 10 per cent of chromium show low resistance, while those containing 20 per cent show high resistance. Commercial alloys are inferior to the experimental alloys because the presence of small amounts of impurities has a marked effect in lowering the resistance to both oxidation and sag. The electrical resistivity of all the alloys was determined between 20° and 1000°C.

Equipment Depreciation Affects Dividends. Trade Winds. June, 1928. P. 11.

Although income tax experts allow the well established rate of ten per cent for machinery depreciation in manufacturing accounting, this is rarely enough where special machinery is involved. Frequently such equipment becomes obsolete in from three to five years. In too many cases the amount charged off is used for dividends instead of being regarded as a liability in the form of a trust fund to keep equipment up to date. For the non-technical man, obsolescence is often difficult to comprehend. A new machine in perfect condition may be obsolete from a production point of view because a newer machine can turn out greater production at less cost. The factor of obsolescence makes it wise to charge off a substantial depreciation and to have the amount charged off available in a reserve fund.

The History of Wire Rope. The Yellow Strand (Broderick & Bascom Rope Co., St. Louis, Mo.) November, 1928.

The third of a series of monthly articles on the history of wire and wire rope. The story so far has traced the history of wire from the beginning of recorded time to the development of wire drawing as an art in the 12th century A. D. The history will be continued in subsequent issues of The Yellow Strand.

Western Electric Group Bonus Methods. Manufacturing Industries. August, 1928. P. 273.

Results of incentive wage plans in operation in the Kearny and Hawthorne plants, which together afford employment to 24,000 workers. 85 per cent of the direct labor and 23 per cent of the indirect labor operate on incentive plans that include individual piece work, gang piece work, gang premiums, and an efficiency rating scheme that is applied to selected day-work jobs.

Trade Literature Received

Wire Rope

"Practical Information on the Use and Care of Wire Rope". A. Leschen & Sons Rope Co., St. Louis, Mo. 32-page pocket-size illustrated booklet, indexed, containing suggestions and instructions for unloading, moving, storing and breaking-in wire rope. There are graphic descriptions of right and wrong ways of uncoiling and unreeling and valuable suggestions as to care, use and safety precautions. There are also detailed directions, illustrated, for binding, cutting and splicing wire rope and for the application of wire rope clips. Useful data tables include stress tests, drum capacities, binding wire sizes, clip fastening strengths, cableway stress and deflection, and haulage stress. A helpful section is devoted to instructions for ordering wire rope.

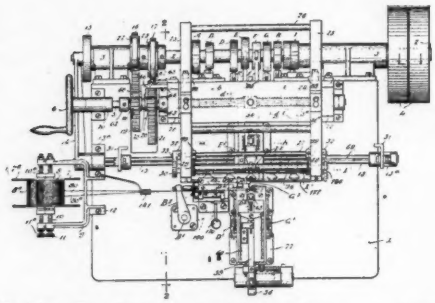
Testing Equipment

"Students' Kelvin Bridge." Leeds & Northrup Company, Philadelphia. 8-page illustrated bulletin describing a simplified model of the company's wider-range instrument for measuring low electrical resistances accurately below 0.1 ohm. The new instrument is designed primarily for teaching the Kelvin Bridge method, which, it is said, has been widely adopted industrially in recent years for determining the electrical conductivity and temperature coefficient of wire and rod and for measuring the resistance of the windings of large generators, motors and transformers, and other conductors of low resistance.

Graphite Lubricants

"Industrial Lubrication." Acheson Graphite Company, Niagara Falls, N. Y. 64-page illustrated catalogue describing a great variety of graphite lubricants with recommendations for their suitable industrial applications. Also contains useful engineering data on lubrication. A supplementary bulletin is devoted to Acheson Lubricating Graphite No. 38, a 99.9 per cent pure electric furnace product for wire drawing lubrication and for protecting wire and cable in the process of manufacture.

A REVIEW OF RECENT PATENTS



Machine For Making Articles of Wire Rings or Links 1,688,988

1,688,988. MACHINE FOR MAKING ARTICLES COMPOSED OF WIRE RINGS OR LINKS. Patented October 23, 1928, by Friedrich August Karl Rolle of Vauxhall, New Jersey, Assignor by Mesne Assignments to Binder Bros., Inc., of New York, New York, a Corporation of New York. A machine for forming wire into rings or links and connecting such links to make an article such as a chain or a so-called ring mesh fabric. In the machine, a plurality of wires of different characteristics may be employed, so as to enable variegated effects to be obtained by making the links of different wires.

1,689,792. METHOD FOR COATING WIRE FABRIC. Patented October 30, 1928, by John W. Meaker of Evanston, Illinois. A new and improved means and method for coating wire fabric used for fencing and other purposes. The object is to provide means to prevent connection of the fabric strands by the coating material and to secure an unbroken coating.

1,688,481. APPARATUS FOR PROCESSING WIRE. Patented October 23, 1928, by Miner Manly Austin of Waukegan and Clarence W. Balke of Highland Park, Illinois, Assignor to Fansteel Products Company, Inc., of North Chicago, Illinois, a Corporation of New York. This invention relates to apparatus for processing wire and pertains more particularly to means for removing carbon and gases from tantalum wire. It provides means for processing the wire whereby it is annealed, the carbon is removed, and the gases are driven off.

1,688,582. REEL. Patented October 23, 1928, by Walter A. Heinrich of St. Louis, Missouri, Assignor to W. N. Matthews Corporation of St. Louis, Missouri, a Corporation of Missouri. A portable reel adapted to be set up readily for winding wire, cable, and the like and embodies features which, after the winding has been accomplished the device may be readily and easily collapsed to permit removal of the reeled material.

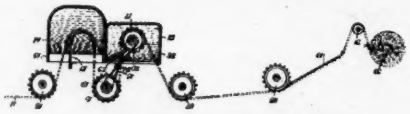
Complete descriptions and drawings of any of the patents referred to on this page may be had for twenty five cents. Address orders to Wire & Wire Products, 551 Fifth Avenue, New York City.

1,689,093. METHOD OF AND APPARATUS FOR MAKING CURLED WIRE. Patented October 23, 1928, by Joseph A. Wolle of Philadelphia, Pennsylvania, Assignor to Union Bag and Paper Corporation of New York, New York, a Corporation of New Jersey. The present invention relates to the art of making metal sponge or similar products composed of flat wires or filaments which are curled or convoluted, and the primary object of the invention is to provide a novel and improved method of and apparatus for making such metal sponge or similar product whereby the same may be produced rapidly and inexpensively from stock wire.

1,689,311. INSULATED WIRE. Patented October 30, 1928, by Edmund B. Wheeler of New York, New York, Assignor to Western Electric Company, Incorporated of New York. New York, a Corporation of New York. An electrical insulating wire which is substantially flame-proof as well as an efficient insulator or non-conductor of electricity. The wire has a coating comprising selenium and cellulose acetate.

1,686,110. WIRE FABRIC. Patented October 2, 1928, by Hyman Tampkin of Brooklyn, New York. An object of the present invention is to provide a wire fabric having links which are specially formed and which are so arranged that the fabric possesses the required flexibility, yet is sufficiently rigid so that it will not sag or be unstable in the direction of its own plane, these objects being attained by specially constructing the two kinds or types of links which are employed.

1,687,089. SAWING WIRE. Patented October 9, 1928, by Richard Duane Green of Trenton, New Jersey, Assignor to John A. Roebling's Sons Company of Trenton, New Jersey, a Corporation of New Jersey. The object of the invention is to provide an improved sawing wire of that class used for sawing marble or other stone by reciprocating a wire strand carrying abrasive material, such as sand or the like, which usually is fed to the wire in liquid during the sawing process.



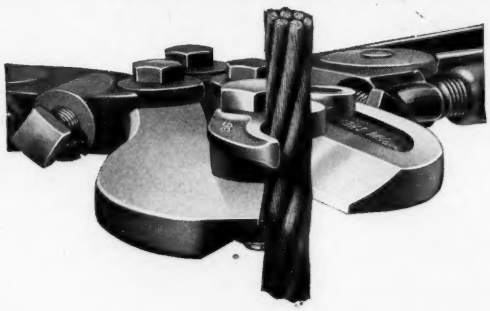
Method For Coating Wire Fabric 1,689,792

1,689,312. METHOD OF INSULATING CONDUCTORS. Patented October 30, 1928, by Robert R. Williams of Roselle, New Jersey, Assignor to Western Electric Company, Incorporated, of New York, New York, a Corporation of New York. The object of this invention is to improve the insulation of electrical conductors of submarine cables. The method of insulating a conductor with vulcanized hard rubber which method consists in rendering the vulcanized rubber plastic and immediately extruding said vulcanized rubber about the conductor by suitable application of heat and pressure.

1,687,579. MATERIAL HOLDER. Patented October 16, 1928, by Samuel McMullan of Downers Grove, Illinois, Assignor to Western Electric Company, Incorporated of New York, N. Y., a Corporation of New York. A device designed to permit the uninterrupted supply of wire coiled on spools and the like, when withdrawing the wire from a plurality of spools. The spools are provided with means for storing or supporting sufficient lengths of the inner ends of the spooled wire separate from the main portions, whereby while the wire is being supplied from one spool the inner end thereof may be unwound and connected to the outer end of a wire wound on another spool without disturbing the main winding on the first spool or interfering with the withdrawal thereof.

1,688,159. DRAWING RING FOR WIRE-DRAWING MACHINES. Patented October 16, 1928, by Peter Darmstadt, Wilhelm Stegmann and Valentin Weil of Fechenheim, Near Frankfort-on-the-Main, Germany, Assignors to The Firm Draht-Industrie Peter Darmstadt & Co., G. M. B. H., of Frankfort-on-the-Main, Germany. In combination with a drawing roller of a wire-drawing machine, an elastic continuous ring fitted freely on such roller, said ring being adapted to contact with the wire along only a portion of its periphery, the ring thus being deformable by the tension of the wire during the drawing operation to vary the area of the bearing surface between the ring and the roller in accordance with variations in the tension of the wire.

A New Hand Cutting Tool



A NEW hand cutting portable tool with the power of a bolt clipper and the cutting action of a shear is announced by H. K. Porter, Inc., Everett, Mass. The tool is capable of cutting with comparative ease wire rope up to 5/8″ in diameter or a steel bar 1½″ x 9/32″—sizes usually cut with a hacksaw or with bench or power tools. The tool can be carried to the job, occupies no more space than a Porter bolt clipper, and embodies the same power multiplication principle of lever and toggle joint.

Originally developed for the aeronautical department of a foreign government, this tool is now released for general sale with the expectation that it will find immedate use wherever wire rope, cable, bar or strip stock is to be cut An illustrated descriptive folder may be had from the company.

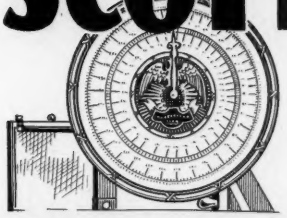
New Invention Makes Wire Records

A DEMONSTRATION has just been given in London of a new apparatus for recording sound by means of magnetized wire. Among the items recorded were a vocal solo, a small orchestra selection, and a recital of a burlesque of a short selection from "Macbeth," attributed to Bernard Shaw.

These were "recorded" into a microphone connected to the coils of a small electro-magnets, past the cores of which a thin steel wire was conducted at a constant speed. The electric, or acoustic vibrations, it was explained, were converted into magnetic vibrations by the electro-magnets, and in this way became magnetically fixed on the steel wire. After several minutes' waiting the whole program, by reversing the mechanical process, reproduced through a loud speaker the complete program, including the announcer's remarks between the numbers. The reproductions were clear and strong in volume, the tonal effect resembling that of a good phonograph. Members of the audience also spoke into the machine and heard the reproduction of their voices immediately afterwards.

Sponsors of the new invention announced that originally the idea was theoretically conceived by a Danish physicist, W. Poulsen, 30 years ago, but the practical realization of it was due to Dr. Curt Stille, who has spent 23 years in perfecting it. A British group has obtained from a German bank the right of manufacture for the world outside of Germany. The machine can be used for recording speeches and office letter dictations to replace stenographers, the wire "record" being wound on a spool for use when required. Another use is as an attachment to a telephone to record messages in the absence of the receiver. By the same means, it is held, the field correspondents of big metropolitan newspapers could transmit telephonically news to their head offices at one-fourth of the present costs.

SCOTT



HORIZONTAL & VERTICAL TESTING MACHINES FOR WIRE

Give visible reading and graphic charts showing strength, stretch, elongation and action under stress. Used to establish standards governing purchasing and manufacturing.

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PROVIDENCE, R.I.

TESTERS

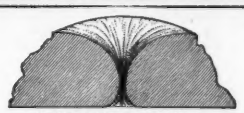
WIRE DRAWING DIAMOND DIES

Over 30 years experience in this line. The best equipped establishment in America with modern methods and machinery.

New way for re-inforcing the diamond.

(U. S. Patent 1,624,027. April 12, 1927.)
Tel. Webster 5105. Cable Address: Krauseco

F. KRAUSE & CO., Inc.
250-252-Ogden Ave.
JERSEY CITY, N. J.



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for strength, easy handling, service and long life

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"American" Pressed Steel Reels and Spools are designed and shaped to impart maximum strength for their weight. They also embody special patented features that contribute to their rigidity and capacity for hard service.

Above is shown a 24" x 16" x 6" "American" Reel with beaded flange for shop use and shipping. Standard models range from small spools with 2½" diameter to giant reels 8' in diameter, and include Stranding, Vulcanizing, Impregnating, Braiding, Annealing, Shipping and Shop Reels and Spools and Beams for a great variety of industrial purposes.

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AMERICAN
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REELS

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Silver Plating Copper Wire

(*Continued from page 411*)

quantity of silver which is precipitated through a current of 1 Amp. during the unit of time, (for instance 1 hour). The current of 1 Amp. precipitates 4,026 gr. of silver during one hour.

If the weight of the silver-plated copper wire having been produced during a certain time is G kg. (copper) and the quantity of silver precipitated on G kg is S kg, the silver percentage of the finished wire being m gr./kg:

$$m = 1000\frac{S}{G+S} \quad (2)$$

and

$$G = S\frac{1000}{m} - 1 \text{ kg.} \quad (3)$$

If we now replace the letter G by the hourly production of wire and the letter S by the quantity of silver which is precipitated during 1 hour on the wire:

$$S = \frac{4{,}026 \cdot J}{1000} \text{ kg.} \quad (4)$$

The driving drum diameter is d in meters, the number of revolutions of the drum is n per minute, and the length of the plated wire is L in m/kg. The galvanic process is used generally for wires with a silver coating of 50 g/kg. For this kind of wire and for large quantities, we may consider their specific weight identical with that of wires of pure copper. For the hourly wire output, we have:

$$G = \frac{d\,P: .\,60 \cdot n}{L} \text{ kg.} \quad (5)$$

Comparing (5) with (3) and (4), we have:

$$\frac{d\,P: 60\ n}{L} = \frac{4{,}026 \cdot J}{1000}\left(\frac{1000}{m} - 1\right) \text{ kg.} \quad (6)$$

and consequently:

$$n = \frac{4{,}026 \cdot J \cdot L}{1000 \cdot d\,P: .\,60}\left(\frac{1000}{m} - 1\right) \text{ rev./min.} \quad (7)$$

or:

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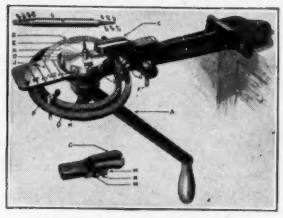

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Satisfactory service is insured by Driver-Harris' 20 years experience in drawing alloy wires.

"Premier" Diamond Dies draw true to expectation any metal in any size suited to diamond die drawing—with a marked decrease in interrupted production—repair work—and replacement costs.

Let us demonstrate the advantage of "Premier" Diamond Dies.

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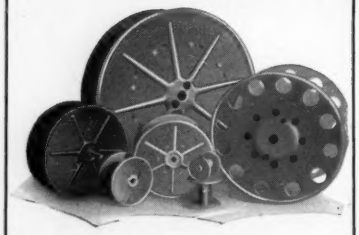

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$$n = \frac{0{,}0215 \cdot J \cdot L}{1000\ d}\left(\frac{1000}{m} - 1\right) \quad \text{rev./min.} \quad (8)$$

The equation (8) allows us to determine directly the influence of various functions such as current intensity, wire thickness and silver percentage on the capacity of the plant. The greater the silver percentage, the more the running speed diminishes. If the capacity of the plant is to be increased, we may increase either the current intensity or the wire diameter. But the current intensity cannot be increased at will. If the current intensity shall not exceed a certain limit (am/cm^2 of metal surface) and the current intensity per each wire must be increased, there is only one possibility; that is: to increase the length of the bath. For these reasons, they now build silver baths up to 8 meters in length. Of course, the invested capital is more considerable, because the anodes and the bath solution must be increased.

Precision Drawing Required

The results are more favorable when the wire thickness is increased, as the weight of wire increases in the second power with the diameter, but the difficulties encountered during the following drawing process are more considerable. The surface is very delicate when the wire has been removed out of the silver bath because the silver coating is still very soft. We recommend, therefore, drawing the wire several times on the simple bench until the coating has acquired the thickness of the core material. The dies or drawing stones must be correctly adjusted and have the required boring. If the wire is to be drawn on the multiple bench, the boring of the drawing stones must be absolutely precise, so as to reduce to a minimum the sliding of the wire on the various steps. As silver is a valuable metal, the slightest defects can have the worse consequences.

The galvanic process requires

perfect cleanliness. All guide rolls must be absolutely clean and all contact rolls must be perfectly polished and run perfectly. There is no need to observe a perfect constancy of the current intensity during the ungreasing process, but the current intensity must be absolutely constant during the silver plating process. The theoretical quantity of precipitated silver based on the current intensity and time correspond with the values obtained in practice. It is easy to control them through weighing the anodes after the process, but the concentration of the silver solution must always be the same and no loss of current should take place.

When using large baths, the bath solution must have the same properties in all points. This can be obtained with the help of a mixing device working permanently during the plating.

The dimensions of the galvanic silver plating plants depend essentially on the required output. Large baths are evidently more productive than smaller, but only when all produced wire can be used effectively. The dimensions of a plant must be fixed according to the average quantity of wire to be used during a normal shift. When the consumption of wire is more considerable, we recommend organizing several shifts because this working method offers many advantages in every respect. In this case, the baths are heated only once daily so that great savings can be realized on fuel; besides, the interruptions are not so frequent and the invested capital is more profitable.

Manufacture, Technology and Testing of Insulated Wire

(*Continued from page 416*)

ery used in other rubber plants. Mixing mills, of course, are the same. Tubing machines differ in that greater speed of output is required and special heads are made to handle wire. Tubers are used to get the rubber directly on the wire or the rubber can be fed out in strips and wrapped

Save money with OAKITE

Give acid a chance!

CLEAN your wire with Oakite before pickling and you gain these advantages:

1. **Uniformly Pickled Surfaces.** Acid does not act on greases carbonized by annealing. Removing these carbonized greases allows the acid to act uniformly.
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3. **Less Acid Brittleness.** Shorter pickling reduces acid brittleness.
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For High or Low Carbon Wire
Working Samples sent on request.

Established 21 years.

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(For hexagon and triangular netting) made from a Special Steel of about 70—80 kg solidity, and

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First class workmanship, in all sizes wanted, as per sample or drawing.

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Made on a quantity production basis, in the largest die plant in the world, these dies, famous by their uniformity and accuracy of finish, can be delivered to you, at once, in small or large quantities, at very reasonable prices, from now on.

VIANNEY

Famous Wire Drawing Diamond Dies

100 5th Ave., New York

(*Continued from page 423*)

around the wire. This method, however, leaves a seam. The unusual machinery required is for stranding and cabling.

Vulcanizing is done in the normal way in open steam and not in presses. The wire is run into pans containing chalk and then placed in open steam vulcanizers. Lead presses are used for pressing out lead.

The sales problem in connection with wires differs from usual customs in that factories sell direct to large users such as electrical goods manufacturers, public utility companies, the army, navy, etc. In bidding on contracts, the bid is usually made an estimate based on process costs. The actual cost of any one cable usually made is seldom obtained. Of course the process costs are accurately determined. Selling prices are always based on current market prices at the time of the sale and not on the original cost of copper or rubber. This is a custom of the insulated wire trade over a long period of years.

Proposed Standards For Trolley Wire Reels

(*Continued from page 405*)

facturer members to check up for shop practice, usefulness and capacity.

As the result of these investigations the Committee has agreed that:

(1) There apparently is a need in the industry for three standard reels for shipping and stringing trolley wire.

(2) These reels preferably should be designated by numbers and should have the following capacity dimensions:

	Flange Dia.	Drum Dia.	Drum Width
No. 1	50 inches	30 inches	20 inches
No. 2	46 inches	30 inches	20 inches
No. 3	40 inches	30 inches	20 inches

(3) There should be a single bushing for all three reels which should be standardized, except for the arbor hole, the size and shape of which may be left to the discretion of the user.

(4) The Committee is of the opinion that in general the user will prefer to provide his own bushing.

Tests for Tin Coated Wire

(*Continued from page 407*)

corrosion being much more rapid than if no coat had been applied. Hence it will be seen how important it is in the case of tinned coatings to know the number and position of the exposed areas and it becomes possible to study ways of eradicating them.

2. The Iodine Test is an excellent test when carried out correctly for estimating the actual amount of tin present per unit of area.

3. The Dipping Test of Bruntons gives slightly better results than the one issued by the Cable Companies, but both these tests are useful for determining the uniformity of coating.

South American Power Project

Usinas Electricas del Estado, Montevideo, is distributing specifications to engineering and contracting companies who are invited to submit tenders covering the construction and equipment of a new thermo electric power station, the cost of which is estimated to be upward of $3,000,000.

Tinning Steel Pins

A request for advice as to the best method for tinning plain steel pins without electroplating has been answered as follows by the technical expert of the Brass World & Platers' Guide:—Steel pins are coated with tin by the zinc contact process in an iron tank lined with sheet zinc. The solution consists of:

Stannous chloride	1 part
Cream of tartar	1 part
Water	1 part

This solution is heated and the pins are immersed and gently stirred to aid a uniform deposit. Galvanic action between the dissimilar metals sets up results in the deposition of tin. The zinc sheet is eaten away and has to be replaced. Fresh stannous chloride must be added as the solution becomes weaker.

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Diamond Dies

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STRONGLY built, with radial ribs and a simple yet very effective locking device that is strong enough to withstand any working strain.

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Export Statistics

FIGURES showing domestic exports of bare and covered wire and wire products, which have been appearing in these columns regularly for several months past, are no longer available from the Department of Commerce early enough in the month to have much news value for readers of *Wire & Wire Products*. The replacement of these reports by selected export data of real significance to the industry is now under consideration and readers' suggestions will be welcome.

Statement of ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of Wire & Wire Products published monthly at Washington, N. J., for October 1, 1928.

State of New York, County of New York, ss.: Before me, a Notary Public in and for the State and county aforesaid, personally appeared Frank Quinn, who, having been duly sworn according to law, deposes and says that he is the Editor of Wire & Wire Products and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Quinn-Brown Publishing Corporation, 551 Fifth Avenue, N. Y. City; editor, Frank Quinn, 551 Fifth Avenue, N. Y. City; managing editor, none; business manager, Richard E. Brown, 551 Fifth Avenue, N. Y. City.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Quinn-Brown Publishing Corporation, 551 Fifth Avenue, New York City. Frank Quinn, Richard E. Brown, Leta B. Brown, all of 551 Fifth Avenue, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

FRANK QUINN,
(Signature of Editor)

Sworn to and subscribed before me this 19th day of October, 1928.

(SEAL) MARY ELIZABETH FLINT,
Notary Public.

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For more complete information, consult the annual Directory, Index & Buyers' Guide.

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Vaughn Machinery Co., Cuyahoga Falls, O.

DIES—Chilled Iron
Waterbury Wire Die Co., Waterbury, Ct.

DIES—Diamond
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Bellet & Bouvard, N. Y.
Cochaud Wire Die Co., New York.
Detroit Wire Die Co., Detroit, Mich.
Driver-Harris Co., Harrison, N. J.
F. Krause & Co., Inc., Jersey City, N. J.
Union Wire Die Corp., New York, N. Y.
Urdika Wire Die Co., N. Y. C.
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DIES—Repairs & Re-Cutting
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Urdika Wire Die Co., N. Y. C.
Vianney Wire Die Wks., N. Y.

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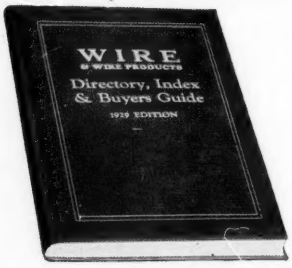

Last Call For Listings

NAMES of manufacturers and listings of their products for the 1929 Wire & Wire Products Annual Directory must be in the hands of the publishers this month to insure being included in the new edition which will be issued in January. Your name will be listed without charge or obligation under the headings you indicate.

Rates for advertising space in units of from one inch to full pages will be supplied on request. Very moderate rates are also available for Bold Face display listings in heavy type that makes the listing inescapably prominent when consulted by the reader.

You are urged to fill out this form **now** to avoid the possibility of having your name omitted from the contents of the Directory.

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MACHINERY—Panning
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Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
M. A. Irmischer, New York.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

NEUTRALIZING COMPOUNDS
Oakite Products, Inc., N. Y.

PATENTS
Lancaster & Allwine, Washington, D. C.

REELS—Annealing
American Pulley Co., Philadelphia, Pa.
Apco-Mossberg Co., Attleboro, Mass.
R. B. Hayward Co., Chicago, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

PRESSES—Rivet & Bolt
M. A. Irmischer, New York.

SOAPS—Wire Drawing
R. H. Miller Co., Homer, N. Y.

SPOOLS—Wire & Cable
American Pulley Co., Philadelphia, Pa.
Apco-Mossberg Co., Attleboro, Mass.
R. B. Hayward Co., Chicago, Ill.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

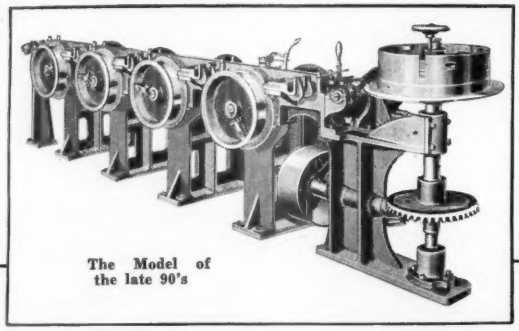
This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.

WATERBURY-FARREL TANDEMS

Three Decades Perfecting Continuous Wire Drawing Machines

We thought the old machines were pretty good in the old days (and they were) but times have changed. Today we offer not a better method nor a new principle, but—a far better machine that meets in eloquent fashion every demand of the present day—

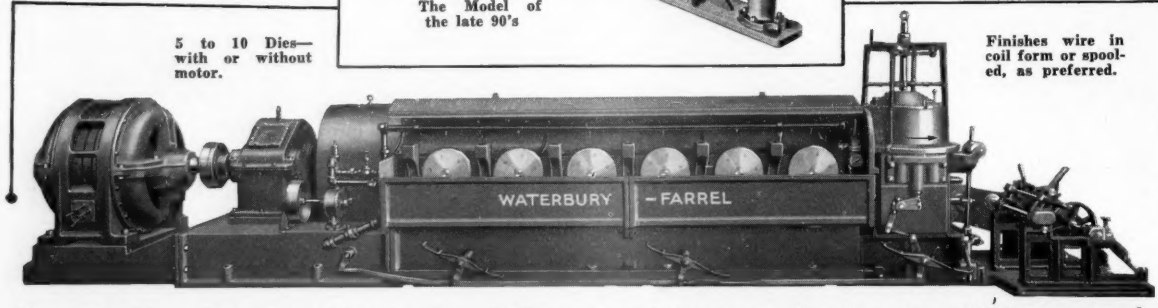
High Speed
Low Operating Cost
Mechanical Efficiency



The Model of the late 90's

5 to 10 Dies—with or without motor.

Finishes wire in coil form or spooled, as preferred.



No. 1 Machine. Forced feed lubrication. Ball Bearings throughout. Starting size, 5/16" copper rod.

The Waterbury Farrel Foundry and Machine Company

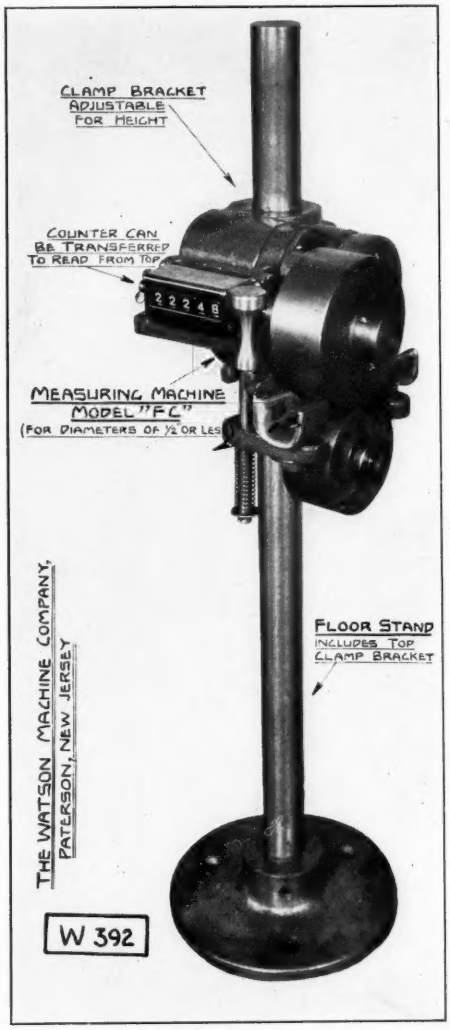
Home Office and Works: Waterbury, Connecticut Western Sales Office: Cleveland, Ohio

THE WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

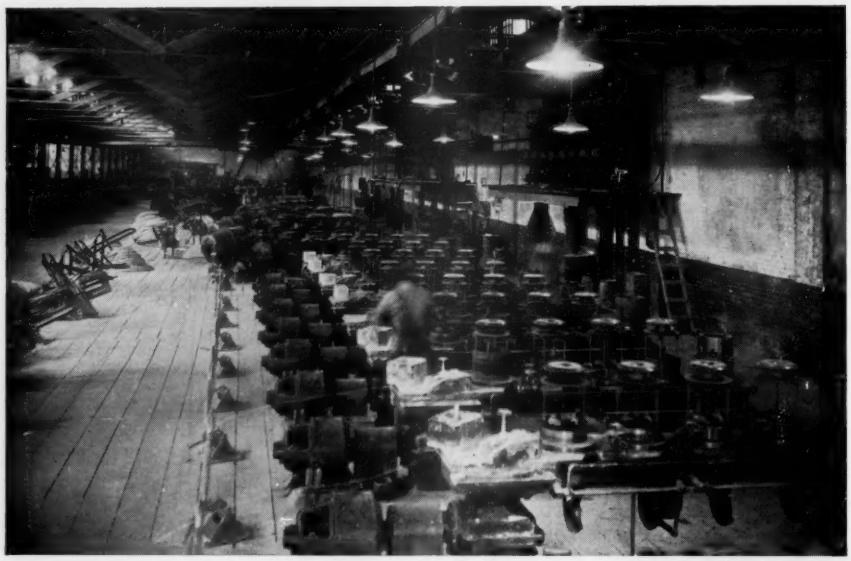
ENGINEERS - FOUNDERS - MACHINISTS


CLAMP BRACKET ADJUSTABLE FOR HEIGHT
COUNTER CAN BE TRANSFERRED TO READ FROM TOP
22248
MEASURING MACHINE MODEL "FC"
(FOR DIAMETERS OF ½ OR LES
FLOOR STAND INCLUDES TOP CLAMP BRACKET
THE WATSON MACHINE COMPANY, PATERSON, NEW JERSEY
W 392

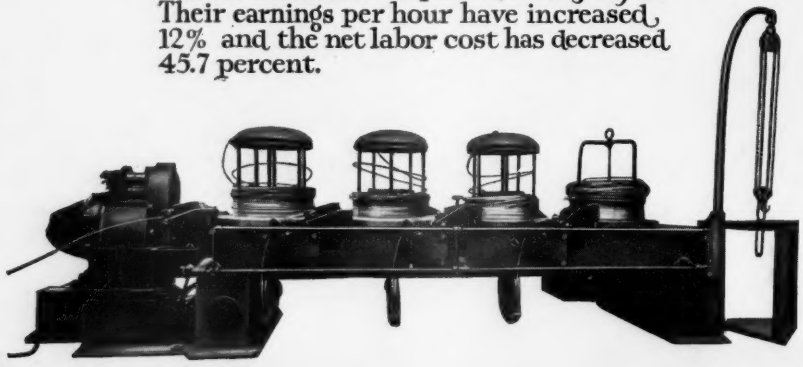
Can Be Used
For Measuring
Flats, Strips
or Sheets
By Removing
Guide Funnels

ELECTRICAL WIRE AND CABLE
WIRE ROPE and CORDAGE MACHINERY

MORGAN
WORCESTER
ENGINEERS AND MANUFACTURERS



Through this installation of
Morgan Connor Wire Machines
twelve men have replaced *twenty-eight.*
Their earnings per hour have increased 12% and the net labor cost has decreased 45.7 percent.



MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS, U.S.A.